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AND
PHOTOGRAPHIC
ENLARGER
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NOTICES.

THE *Optical Magic Lantern Journal and Photographic Enlarger* is issued on the 1st of every month, price Two Pence, and may be obtained from all Newsvendors, Railway News Stalls, Photographic Dealers, or from the Publishers, at the following rates, post free:—

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EDITORIAL communications must be addressed, **J. HAY TAYLOR.** Advertisements and business communications to **Jos. T. Smith, Secretary, Magic Lantern Journal Company, Limited, 9, Carthusian Street, London, E.C.**

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NOTES.

A Happy New Year to all.

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Scientific use of the Cinematograph.—The cinematograph is to be used on the 21st inst. to photograph the eclipse of the sun. An instrument has been perfected for the purpose by Mr. Maskelyne, of the Egyptian Hall, which is to be taken out to India by the Rev. J. M. Bacon, who has charge of the British Astronomical Association Eclipse party. It is the intention to take a series of photographs at the rate of six per second, and it is expected that this will settle the question as to changes of the appearance of the corona during the eclipse.

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Sheffield Lantern Society.—On the 2nd ult. the members of this thriving society held their annual dinner at the "Black Swan" Hotel. The gathering was a large and influential one, under the presidency of Dr. Manton. After the usual toasts had been given, the president gave an illustrated lecture (Mr. Staniforth at the lantern), then followed a good musical programme.

Yarmouth Missions to Seamen Society.—A short time ago the chaplain to this Mission expressed the hope that £10 would be donated for the purpose of buying a lantern and slides to entertain the fishermen when ashore at this port. £11 5s. was soon collected, and the entertainments will be got into shape without delay.

◆ ◆ ◆

Importers and Exporters.—In the ANNUAL, several pages of importers and exporters were to be found. These pages, we may say, were bound up immediately following that part over which we exercised our editorship. This editorship was, however, confined to a given number of pages, as per our arrangement with the Magic Lantern Journal Company, Limited, the proprietors, and included only those pages devoted to original articles, and the particulars of new apparatus. With these our duties ended. The business department, however, decided to bind up with the ANNUAL certain lists of exporters and importers, and up to the time of the 1897-8 ANNUAL going to press we personally opposed this (not on the score of any infringement of copyright, for we were ignorant of their source, but on other grounds). In this matter we were over-ruled, and the name of the official of the company responsible for such was inserted at the head of the lists. We have been informed that these lists were taken from the *Mercantile Year Book and Directory of Exporters*, which is conducted by Mr. Walter Lindley Jones, of 21, St. Helen's Place, E.C., to whom a letter of apology has been sent by the Company, together with a cheque, which has been accepted on the understanding that the lists be withdrawn from all copies of the ANNUAL in hand. This latter we learn has been done, and the proprietors wish us to announce to any subscribers or members of the trade who possess copies containing these lists, that the revised edition of the ANNUAL will be sent free of cost on receipt of the old copies. Personally, we regret the insertion of such lists coupled with matter which had been passed by us in our capacity as editor, and take no blame whatever on our editorial shoulders.

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Fatal Acetylene Explosion.—A Dalziel telegram states that a terrible explosion occurred the day before Christmas at the Acetylene Gas Company's works, Jersey City, U.S.A. The explosion of one gas tank containing acetylene caused eight or ten others to explode, hurling a dozen men a distance of 20 feet, and killing fifteen outright. The works were set on fire and totally destroyed.

◆ ◆ ◆

A Lantern Operator Publicly Thanked.—Much depends in a lantern lecture upon the operator at the instrument, yet how seldom does he get a vote of thanks. As a rule all the credit goes to the person who gives or reads the lecture. About a fortnight ago Mr. E. Dockree gave an excellent lecture at the Ealing Photographic Society, and at the termination gracefully complimented Mr. A. Richardson for the splendid manner in which he had projected the slides. It is only when the lecturer understands the management of a lantern that he has any idea of the amount of skill required on the part of the person in charge of the lantern.

◆ ◆ ◆

Change of Name.—The firm of Peters, Mantz and Company, of Worth Street, N.Y., U.S.A., makers of lantern apparatus, has been changed to that of Keller, McMillan & Mantz. The new firm are preparing a large catalogue which they inform us will reach us at an early date. When we receive it, we shall have pleasure in commenting upon it.

◆ ◆ ◆

History of Cinematographs.—On another page will be found an interesting article by Mr. W. C. Hughes, which he has written expressly for his book "Art of Projection," published by him. We are indebted for the opportunity of its thus early appearance in our columns. In the "Art of Projection" the subject is dealt with at even fuller length, and in this latter allusions are made to the apparatus manufactured by Mr. Hughes' firm.

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X-Rays and Customs Examination.—The French Customs authorities have discontinued the use of the X-rays for examining luggage, as it has not met with the success that was anticipated.

◆ ◆ ◆

Peddling Spectacles.—A curious case has been brought against the Mayor of Buffalo, N.Y., U.S.A., for refusing to grant a license to a pedlar who has been in the habit of selling spectacles. The reason for the refusal was that the pedlar would be unable to properly fit the eyes of his patrons, and thus more harm than good was likely to result.

◆ ◆ ◆

Lectures on the Navy.—On the 15th and 22nd inst. Captain S. E. Wilmot will give popular lectures, illustrated with lantern slides, at the Imperial Institute. We learn that these lectures are to be specially applicable to juveniles.

A Hanging Cinematographed.—On the 18th ult. a man was publicly hanged in Missouri, U.S.A., for murder. A large crowd congregated, as is usual in such cases, and a photographer in the vicinity took a series of cinematographic pictures of the event. The set of slides illustrating the gruesome spectacle have been pronounced "good," and these are to be duplicated and public exhibitions given in various towns.

◆ ◆ ◆

£200 in Prizes.—A photographic competition is announced by the Thornton-Pickard Manufacturing Company, Limited, for work done by means of the apparatus manufactured by them.

Viewing Film Transparencies in the Cinematograph Without Projection.

IT almost becomes necessary to apologise for the spelling of the word cinematograph, for we have been taken to task for not commencing it with a "k," one correspondent asking: "Why fly to the French language for the 'c'?" However, usage has a great deal to account for in this. Dealers and exhibitors have to a large extent adopted the former spelling, and, besides this, it is now so generally understood by the public, that to educate them to a change of initial letter is much easier said than done. So—for the present, at any rate—we will spell it *cinematograph*.

Many cinematographs have only one sprocket wheel, and it is to those which we will allude in the following remarks. It often happens that one would like to inspect some films, or perhaps at a moment's notice show one to a friend, without having to go to the trouble of projecting them on the screen. With the single sprocket wheel the film can only be passed through in one direction, and that is downwards; this, for projection purposes, is, of course, quite correct, but if one intends to look through the lens at them with a light placed beyond, it is necessary that recourse be had to some means whereby the image can be erected, otherwise the pictures will be viewed wrong way up. If the film be placed in the instrument the other end about, so that they will appear the correct way up, all the movements will, of course, assume a backward appearance.

The erection of the image can be attained by the use of an ordinary erecting prism (as at Fig. I.), which can be held in the hand in front of the lens so that the rays of light pass through (as shown in the dotted lines). The portion of such prism that is utilised is marked A, while that part which could, if desired, be cut off is marked B.

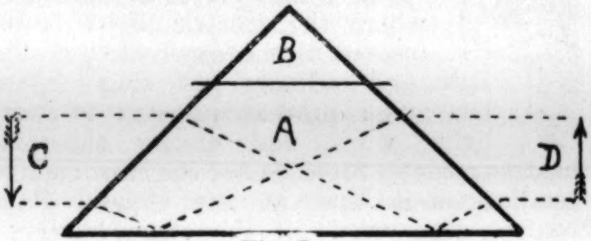


Fig. I.

Prisms which are of high class and accurately ground are somewhat expensive, and if one does not possess such, a cheap and simple form can be made after the style suggested in our columns some time ago by Mr. E. D. Bartlett, which arrangement consists of three thin mirrors arranged at angles shown at Fig. II., the dotted lines showing the arrangement of erecting.

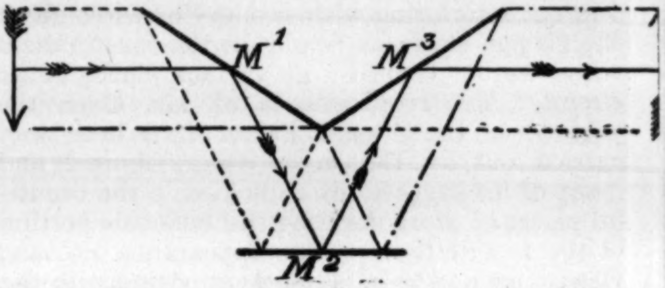


Fig. II.

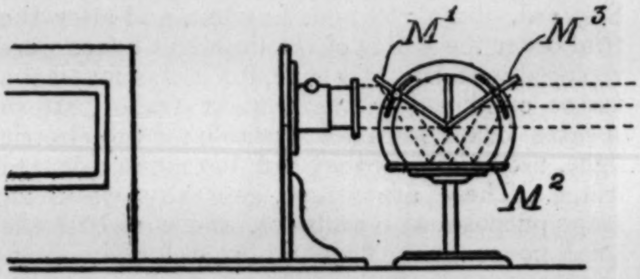


Fig III.

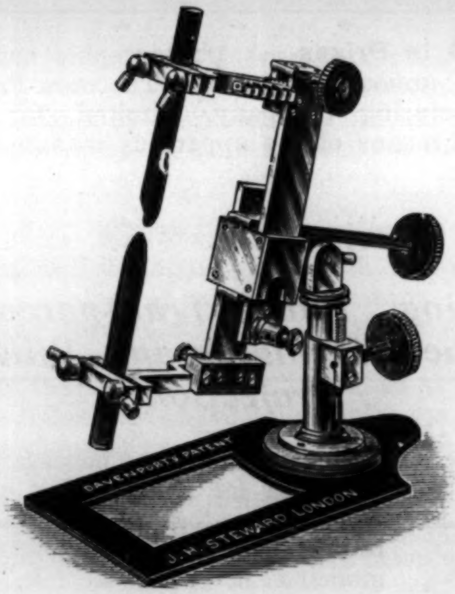
Fig. III. shows a convenient way by which these mirrors can be adjusted. When viewing cinematographic pictures in this manner it is necessary that a piece of, say, opal glass be placed between the light and the film, else will the best of films appear both streaky and weak.

Electric Light in Theatres

THE great reduction in the amount of premium on fire insurance of theatres and places of amusement where the electric light is used instead of the oxy-hydrogen limelight and ordinary gas stage lighting has given quite an impetus to electric light work, and among the many theatres recently fitted, one of the most complete installations is that at the Crystal Palace theatre. The whole of the stage lighting is controlled by some very complete but simple switchboards, graduating water resistances for the incandescent lamps, and suitable resistances for the arc lamps, and, what is a great advantage in point of convenience, all the wires or leads, as they are called, return to the switchboard, where safety fuses are inserted, and all are so readily get-at-able that if a "blow-out" of any fuse occurs, it can be at once replaced without interfering with scenery or wires about the flies or stage, as would be the case if main wires were "tapped" at various places in the circuit. The requirements of Mr. Carr, the engineer of the Crystal Palace, have been well carried out by Edison & Swan, Limited, and many of his suggestions embodied in the beautiful pieces of work forming the scientific portion of the installation. The appearance of this, viewed as a whole, is most imposing with the voltmeters, ammeters, etc., and its utility as demonstrated the other day is beyond question, while the safety and general adaptability for the purpose has been duly certified by the County Council Inspector.

Instead of limelight, the theatre light boxes, having special lenses, are fitted with Davenport's arc lamp, made on a modified plan by J. H. Steward, of 406, Strand, London, and after the trial order the whole of the limelight boxes were replaced with the new type, for it was found the lenses employed in the regular trade pattern theatre boxes were not suitable for the electric light, producing, as they did, too much coloured fringe. These arc lamps generally work for stage purposes at 8 amperes, and with both the small boxes for the flies and larger for illuminating the scenes they answer capitally with this current.

The exposed parts of lamp are covered with asbestos, while the boxes are designed for good ventilation, and are lined with Russian iron, besides having a skin of asbestos between the wooden cover and the iron. For larger currents such as are required for cinematographs and special optical projection Mr. Steward has recently brought out a new pattern of the Davenport patent lamp, which can be used with any current and any size of carbon, if necessary as much as 30 amperes, but generally it will be found that 15 to 20 amperes will be all that is required. The form as seen in illustration is adaptable to almost any optical lantern with little or no alteration, and when on its tray every possible adjustment is quickly and accurately obtained for centering with the most delicate optical system, the vertical rack being specially useful in giving alteration in height without interfering with the distance from condenser.



It has been estimated that the use of electric light instead of oxy-hydrogen for uses as above, results in a saving of about 50 per cent. in cost of working.

* * *

How Cinematographic Machines Work.—No. II.

By MAGNET.

IN the year 1888 Louis Anné Augustin Le Prince, of New York, obtained a patent for an invention, based upon the hypothesis that the impression produced upon the retina by objects in motion is approximately the same as that which would be produced by presenting to the eye in rapid succession a great number of pictures representing the successive positions of the object at exceedingly short intervals of time; such pictures he termed "animated" pictures.

The apparatus he employed consisted, firstly, of a photographic camera for the negatives; and secondly, a projector for projecting the pictures obtained by the camera on a screen in the order in which they were photographed, whereby the successive impressions on the eye of the spectator will convey a true idea of the changing appearance of the objects within range of the camera during the exposure.

The accompanying sketch (Fig. V.) shows a view partly in side elevation, and partly in section of the arrangement he used for projecting the animated pictures. The film transparency is mounted on two ribbons of metal, punched with holes H^7, fitting on the pins P^1 of the guide rollers G^6 G^6, the transparencies being stored on drums D D^1, which run loosely on shafts having square ends, and are supported in grooves M^6 M^6 in the framework C^6. The weights and cords W^1 W^2 rolled on small pulleys P^2 P^3 secured to drums D and D^1 maintain the necessary tightness and steadiness of the films. At the back of the films is the reflector R^1, with 16 or more incandescent lights supported by the rods E^1 sliding in socket F^6. In front of the reflectors are 16 double condensers K^5 K^5, throwing the light through the 16 pictures, and mounted on a frame L^6 grooved at I^5, so that they may slide in and out of the frame C^6 laterally when required.

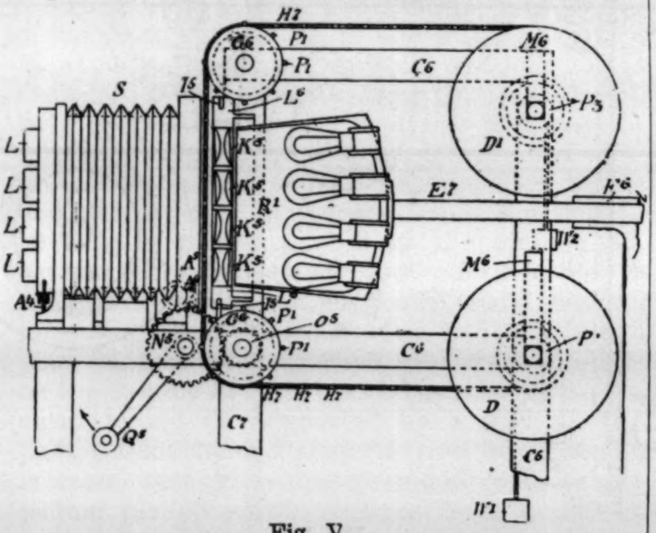


Fig. V.

The lower of the guide rollers G^6 carries a pinion O^5 gearing in wheels N^5, supported by the frame C^6, and provided with the crank handle Q^5.

A number of shutters were employed, operated by a mutilated gear wheel, which was so arranged to expose one picture after the other in rapid succession.

The speed of one revolution of the wheel A^4 per second will give 960 pictures per minute, and in this manner it will be seen that by increasing the rate of motion of the wheel A^4 it is easy to produce several thousands in the same time; and with drums of large diameter, and a few reserve boxes at hand to be fixed behind the objective, it will be possible with a suitable light, and by means of the projector, to reproduce the aspect of animated scenes, such as meetings, processions, races, and the like.

It is also mentioned that when the receiver is provided with only one lens, as it sometimes may be, it is so constructed that the sensitive film is intermittently operated at the rear of the lens, which is provided with a properly timed intermittently operated shutter, and correspondingly in the deliverer. When only one lens is provided, the band or ribbon of transparencies is automatically so operated as to bring the pictures intermittently, and in the proper order of succession, opposite the said lens. (No. 423 of 1888.)

Among the earlier workers who devoted their inventive talent to the development of cameras for taking photographs in

rapid succession

is the name of Friese Green, a photographer, and Mortimer Evans, civil engineer. In the early part of 1889, a patent was applied for by these two persons, of which the following account may be of interest to the readers as it contains much that is still adhered to in many of the recent forms of cinematographs. Referring to the accompanying figures, A is a main shaft upon the rotation of which the operation of all the parts is dependent. It is supported on opposite carrying frames and is rotated by a winch-handle inserted through a tubular light shield inserted through the side of the enclosing case. 10 is a roll of sensitised paper; 11, strip which passes from between such roll and a feed-roller 12, under a guide roller 13 between exposure screens 13, 14, 15, between rollers 16, 17, to a take-up roller 18 which derives its motion directly from the shaft 5, and imparts simultaneous and a corresponding extent of motion to the roll 10, through the roller 12. The roll 10 can freely rotate on a supporting pin 19, which is supported by the framework. It is driven by frictional contact with the roll 12, the surface of which is roughened and which in turn is driven by frictional contact with the roll 20, of the exposed strip which accumulates on the flanged take-up roller 18.

The roller 18 is mounted on a supporting pin 24 which is screwed into or otherwise suitably supported by the frames. It is driven by frictional contact with a split tubular hub 25, projecting into the hollow axis 26, *vide* Fig. VI., from a toothed pinion 27 mounted on the pin 24 and which is driven from the toothed wheel 28 on the shaft 5 by suitably supported connecting gearing 29, 30, by which it is caused to receive a relatively increased speed of rotation which is effective through the frictional contact of its hub 25 with the hollow axis 26 of the roller 18, in causing the latter to take up the slack of the exposed strip immediately it is advanced by the operation of the rollers 16, 17.

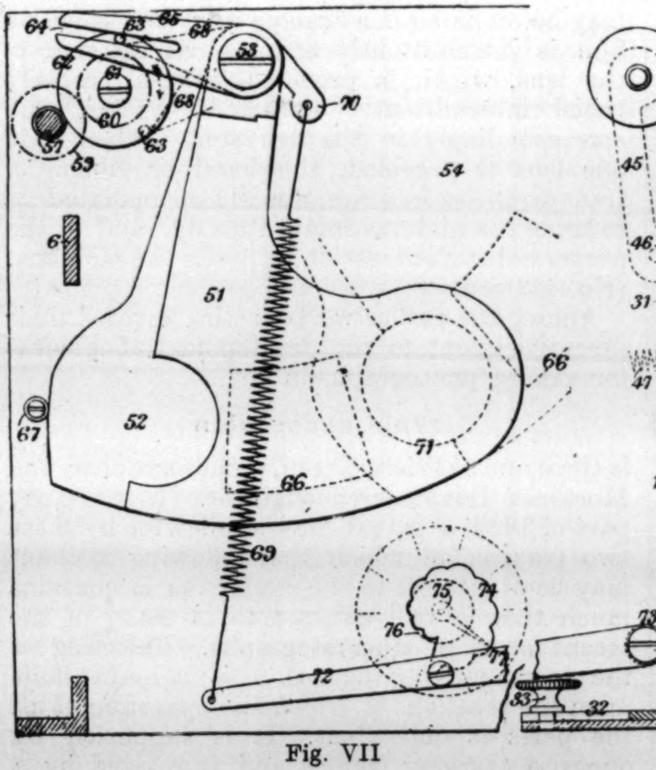


Fig. VII

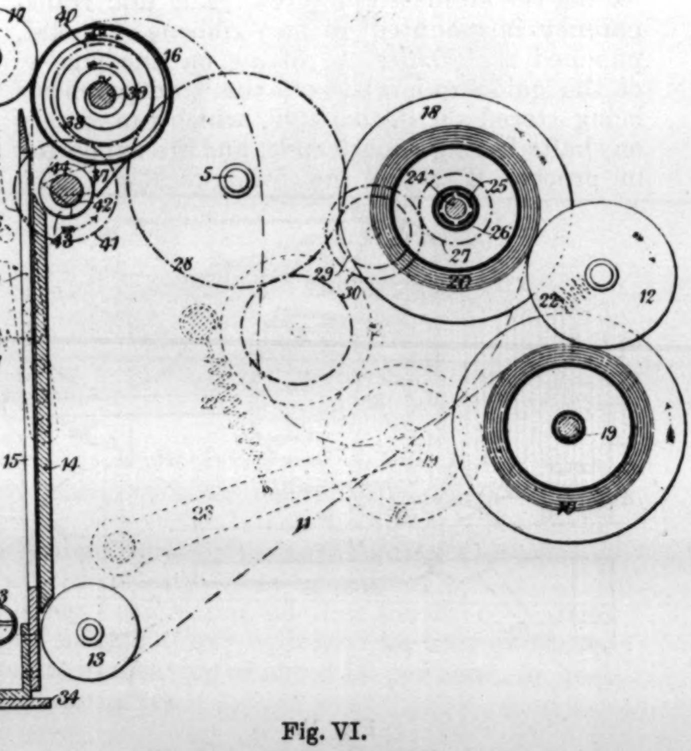


Fig. VI.

The roller 13 guides the strip between the screens 14, 15.

The exposure screen 14 prevents any light from reaching the sensitised strip behind it and the screen 15 is made with an aperture 31 through which the photographic representation can be projected on to the portion of the sensitised strip supported between the screens.

The roller 16 is provided with end caps and with projecting pointed discs, and is made fast at the one end to an escapement tooth 37, and is connected by a spiral spring 38, to a spindle 39 by which the roller and such attachments are supported. The spindle 39 is carried in bearings in the frames and has pinned thereon a toothed pinion 40, which gears with the wheel 28 and is continuously rotated from the shaft 5. The gearing 28, 40 is so proportioned that one revolution of the winch-handle will affect two complete cycles of the operations. The pinion 40 gears with another like-sized pinion 41 fast on a spindle 42, which is carried in bearings in the frames, and carries a hollow escapement hub 43 on the circular circumference of which the tooth 37 normally rests. While the tooth 37 thus rests on the hub 43, the roller 16 remains stationary, and the portion of the strip 11, between the screens 14, 15, is arrested, and the exposure is affected; and meanwhile the continuing rotation of the shaft 5 causes the unwinding of the spring 38, and the rotation of the hub 43, the recessed part 44 of which once in each revolution permits the tooth 37 to pass, whereupon the spring 38 causes the roller 16 to complete a revolution (the motion of the roller being then again arrested by the tooth 37 again coming into contact with the circumferential part of the escapement hub 43, which revolution is effective in advancing the strip 11 the required length, advancing the exposed portion towards the take-up roller 18, and drawing the next following portion, let off from the roll 10, into position for exposure. As the operations of the roller 18 are limited to the extent of the portion advanced by the roller 16 to be taken up, and as such advanced portion is equal to the length of the strip required for each of the photographic representations, it follows that wherein the roller 12 is actuated from the roller 20, that the winding up of each such portion will cause the roll 10 to simultaneously unwind a corresponding length ready for the next photographic representation, and that this will always occur notwithstanding the continually decreasing diameter of the roll 10 and the continually increasing diameter of the roll 20. The roller 17 is supported by lever arms 45, which are pivoted at 46 in the frames and it is borne against the end parts of the roller 16 by adjustable springs 47 hooked to the frames. It is formed with raised rims which prevent its intermediate part from injuring the sensitised face of the strip, and with

Intermediate grooves

which allow of the projecting rims of the roller 16 getting an effective hold of the edges of the strip.

The shutter is timed to operate during each of the times the portion of the strip in position for exposure is arrested in such position. It is composed of two reciprocating portions 51, 52, both operated from the shaft 5. The part 51 serves principally as a light screen, and reciprocates on a light spindle 53 supported by an end plate 54, and is operated from the shaft 5 by a bevel pinion pinned in the spindle 39, gearing with a like-sized bevel pinion fast on a spindle 57, which is supported on a bearing projecting from the framework and in the end plate 54, and by a toothed pinion 59 also fast on the spindle 57, and which gears with a like-sized pinion 60 supported by a stud 61 projecting from the end plate 54, and which pinion is made fast to a disc provided with a projecting pin 63 which engages with a slot 64 in an arm 65 which is made fast to a shutter 51, such gearing being proportioned so that each revolution of the spindle 39 imparts one complete reciprocation to the shutter 51. The shutter 52 is made with an aperture 66, and also rocks on the spindle 53, and it is raised together with the shutter 51 from the position indicated in full lines in Fig. VII. (where the shutter 52 abuts against a rubber stopper 67) to the position indicated in dotted lines, which position the shutters assume immediately preceding the moment of exposure, by the pin 63 engaging with the arm 65 of the shutter 51, and with an arm 68 made fast to the shutter 52. Immediately the pin 63 passes beyond the range of the arm 68, the shutter 52 is actuated by the contraction of a spring 69, which is connected to an arm 70 projecting therefrom, and its aperture is thus caused to cross an aperture 71 (the position of which is indicated in dotted lines) made in the case 8, and into which the lens is inserted, thus permitting of the necessary exposure of the then stationary portion of the strip to the momentary action of the lens, immediately following the occurrence of which both shutters 51, 52, assume the positions indicated in full lines in Fig. VII.

The speed of action of the shutter 52 can be adjusted as may be required by regulating the tension of the spring 69, which may be effected by means of a lever 72 pivoted at 73 to the end plate 54, and to one end of which the spring is connected, the lever being capable of being set into different positions by a nail 74, on a pin 75 passing through the front of the case, and operated from the exterior by a thumb nut 76, adapted with an index and pointer 77, so that any desired definite tension may be readily given to the spring for regulating the period of exposure as may be required. The whole of the aforesaid mechanism is enclosed in a suitably shaped case, the actuating handle (if worked by hand), the lens and exposure regulator alone projecting or being visible from the exterior. (No. 10,131 of 1889.)

(To be continued.)

Duncan's Mechanically-Worked Triple Lantern.

By G. R. BAKER.

THE readers of this journal have had put before them recently the particulars of Beechey's and Keevil's dissolving-view lanterns, and the points of interest in each having been enlarged upon, it occurred to me they would like to know something about a mechanically-worked triple lantern constructed some 13 years ago. It is the first time it has been illustrated in the technical press and fully described, and I have no doubt it will claim attention at sight. The inventor, Mr. W. H. Duncan, at that time residing at Coalbrookdale, and now of Acton, Middlesex, deserves great credit for the skill shown in scheming out the mechanical arrangement, and for the ability displayed in constructing the apparatus for the control of light, dissolving, and slide-changing.

The idea that occurred to Mr. Duncan was that if a high-class dissolving view lantern could be made that would enable one person—if need be, the lecturer—to sit down and change the slides at will by some simple appliance, it would be a great boon, and being an engineer he set to work and constructed the apparatus as illustrated, with which he could, by pressing on a pedal, dissolve and bring on the next picture. As all the slides were arranged beforehand in proper order on one side of the lantern, and an empty box or receptacle on the other, provision was at hand to receive the slide that had been shown, and which had been passed through the lantern mechanically.

In order that the details of this arrangement may be understood, I will refer to the illustrations.

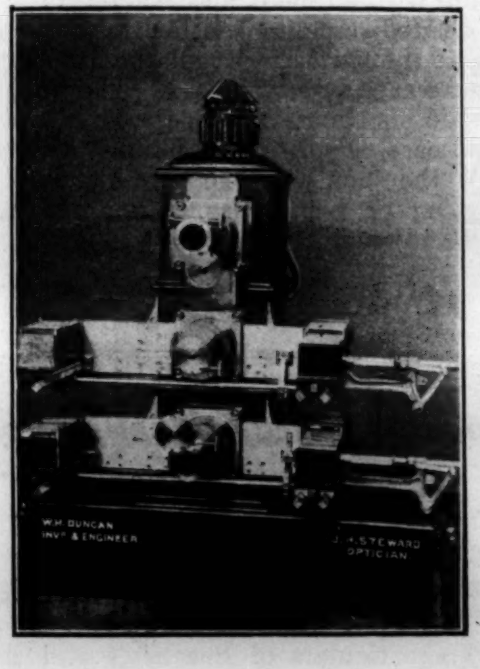


Fig. I shows the apparatus in front elevation.

The slide-changing arrangements consist of four brackets bolted to the sides of the lantern body, and which carry eight horizontal guides that are fitted with four sliding-racked receptacles for carrying the photographic or other slides. Two grooved conductors are fixed in position so that when moved, they push or conduct the slides from the rack and pass into the optical axis for exhibition, and also deliver them into the receiving rack on other side of lantern body. The lower and the upper pairs of rack carriers referred to are moved forward, one pair at a time, by a ratchet wheel and pinion, and the travel of the rack is equal to the distance from centre to centre of the divisions of the rack.

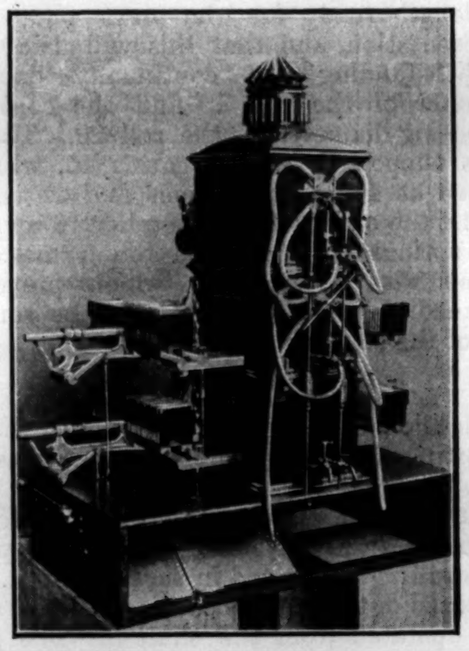


Fig. II. shows the apparatus in back elevation.

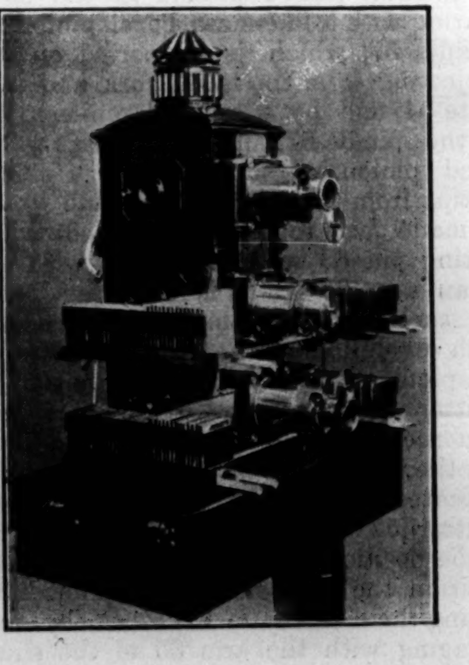


Fig. III. shows a perspective view of front and side.

As explained, two of the racks are filled with pictures and placed in position on one side of the lantern; the first pictures are put in line with the conductors in each lantern, and empty racks are similarly placed on opposite side of lantern to receive the slides. A lever actuating a plunger pushes the first picture out of the rack, and then passes into the conductor and before the light, and when exhibited the requisite time, passes into the empty rack on opposite side of lantern.

On the return of the plunger referred to, the stroke affects the dissolving automatically, for the dissolving tap is turned, and, as will be seen by Fig. II. it is a six-way one (the lower), it follows that the light is lowered in one lantern and raised in the other. This movement is performed by the vertical weighted rods being alternately lifted by the under levers shown in illustration. The act of making this movement advances the racked receptacles one space, so that when the next slide is wanted and the lever or pedal controlling the mechanism is depressed, a new picture is brought in front of condenser. An indicator is provided, so that no mistake may be made, the downward motion depressing a pointer which shows which lever has to be pressed next.

By this means mechanical arrangements are at hand that by one movement of the lever a new slide is placed in the lantern after it has taken out the used one and placed it in the receiving rack. This it does at the right moment after it has darkened the lantern where the change has to be made, and has also raised the light in the other lantern; thus slide-changing and dissolving are mechanically performed at one operation. The third (top) lantern is fitted for use with effects or special slides, and is provided with on and off gas dissolver.

A Little Information about the Cinematograph.—No. I.

By W. C. HUGHES.

THE cinematograph, as it is called, is one of the greatest novelties of the age, and, therefore, considerable public interest is taken in it. It originated from the old zoetrope, which was first made by Dubose, the optician of Paris, who carried out the ideas of Plateau, an inventor—a blind man. Mr. Muybridge, of America, made the study of motion a speciality; he arranged a battery of cameras, and had a kind of race-course prepared opposite them, so that by the aid of an electrical arrangement he could reverse the shutters of the lenses at fixed points showing the exact movements of any kind of animal passing in front. Mr. Edison, the great inventor, had also stated that a machine might be made which could be used for the eyes just as the phonograph is used for the ears, working them together so that both motion and sound could be produced at the same time. He tried to do this microscopically, so to speak. It is stated that he gave to each picture one exposure of nine-tenths of one-forty-sixth part of a second, and that the mechanical part of the machine moved the sensitive tissue forward the breadth of the picture in the remaining one-tenth of one-forty-sixth part of a second. Forty-six pictures were taken for each second of time, making 2,760 in one minute, or 165,000 per hour.

An idea in the cinematograph direction was first thought out by Mr. Freise Green, of England; another gentleman also invested much money in perfecting a machine for moving pictures, but did not bring it to a

successful issue

—many years of labour without result. The machine was of very large dimensions, large enough to fill a small room. It may have cost over £1,000; anyhow, it broke the inventor's heart, and he died—and his expensive apparatus was sold by auction for something like £15. Since then numbers of inventive brains have taken the matter up, viz., Lumiere Frerés, of Lyons and Paris; Mr. Paul and others, of London, were the first to introduce it publicly into England. The principle of the machine is constructed to show motion in its various stages of action. The action makes the figures, as it were, appear stationary, yet full of life. Most machines have shutters to close out each picture during every stage of its movement, but, unfortunately, they cause a great amount of flickering which is very distressing to the eyes, and will often cause sickness and headache; in fact, some of the machines are so unscientifically constructed that the shutter itself cuts off half the light, which produces a nauseating, flickering, dark shadow, and an audience thus becomes wearied and tired of the performance. Exhibitors should note this defect, and have as little to do with most shutter machines as possible, otherwise their reputation will be damaged. The only way to avoid this unpleasant defect is to dispense with the shutter altogether.

WHAT IS THE VALUE OF A SHUTTER?—Where films are printed very darkly and with dark backgrounds in order to improve the contrasts it may be desirable to use a shutter—not a large one that covers half the picture, but a small one, constructed on such precise geometrical lines that it shall work very perfectly and cause as little flickering as possible.

But do not use it only in the case of exceptional films, for remember no matter how small the shutter is the impression is always left on the retina of the eye about one-tenth of a second, but, as before stated, with dense films it will be found very useful indeed.

The machines now in use are legion, but eight-tenths of them are not worth the brass they are made of, being clumsy, inefficient, badly constructed, and noisy, like the clanging of a hammer in a blacksmith's shop or the rasping of a piece of iron on a nutmeg grater, the inventors in many instances being mere tyros without any mechanical knowledge whatever. The most successful and

perfect machine

of the future will be the simplest and the least complicated; the others should be avoided. The more simple, the most effective and the best for results. It is absolutely necessary to have high-class engineering work, not as many are made, very indifferently — the working parts only stamped brass and the fittings uneven, and not true—because great strain is put on all the working parts on account of the rapidity with which the mechanical parts are revolved, that unless scientifically constructed and well made will always be a failure, sometimes twelve to fifteen hundred pictures passing through the machine in less than a minute. Purchasers should see at a glance whether a machine is thoroughly well made or not; if not well constructed they should have nothing to do with it.

To describe the machine more fully would be waste of time, there are dozens on the market all aiming to the one end, perfectly or imperfectly as the case may be, therefore purchasers should be chary and invest with their eyes open, and secure one from a specialist in optical projection in order to ensure success, and not, as many do, seek advice of inexperienced dealers or commission agents, who may be quite ignorant of technicalities. Some of the machines tear the films dreadfully, and utterly spoil them in a month. It is said that one of the cinematograph machines tears the films so badly they do not last even a fortnight. On the other hand, there are several which do not tear or injure the films in the least.

Many of the machines are an infliction, and the public are becoming tired of them because they project the living pictures so badly that the name of an animated picture show—as it used to be in the case of a lantern show—is sufficient to drive people miles away; but an exhibition given with a perfect machine, without the shutter, or, if any at all, a suitable one, together with first-class pictures, is a real pleasure and a treat, and will always be welcomed with delight either publicly, privately, at home or abroad.

The optical systems and illuminating mediums play an important part in the matter. The lenses and condensers should be so arranged as to pass the greatest amount of light through the film to the screen. The front lenses should be about 2-inch back focus, and the condensers of short focus. The film is placed between these at a suitable distance in order to intercept the cone or rays of light formed by the latter at a point where nearly all shall pass through with comparatively little waste. Between the film and condenser there should be placed a glass trough filled with water. The addition of alum which so many think useful in effecting the heat rays is not necessary, water alone being sufficient. The celluloid film should not be allowed to remain stationary for any length of time before an unprotected light, otherwise it may become injured, but in fixing or adjusting the film there will be sufficient light reflected to enable the operator to see what he is about.

To be candid, the audience should never see what is going on, either before, during, or after an exhibition, it is unprofessional and slovenly. The cleaner and neater it is done the more it is appreciated by those on the other side of the screen.

(*To be continued.*)

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The Lanternist's Practical Cyclopædia.—No. XV.*

By **CHARLES E. RENDLE.**

LANTERNESCOPE.—An instrument for viewing transparencies. Its advantages are numerous, and useful. Like the graphiscope, the photograph is magnified many times, which brings the details into bold relief, thus enabling the lanternist, or person concerned, to pick out the features of interest in landscape, sea-piece, architecture, etc. The lanternescope will be found a valuable aid to lecturers in compiling their literary matter, as by looking into the instrument the writer can give a more graphic account of the merits or demerits of the picture—on the screen as it were—than he otherwise could do; unless of course the lantern was lighted up for that purpose. They are obtainable in a single or binocular form, the former being optically arranged for one eye, the latter for two eyes.—*See* also Binocular Lanternescope.

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Lantern Season.—Generally considered from the end of September to the beginning of the following April. Literary, scientific, and other institutions have what they call an autumn and winter session, and it is during those terms that they engage the services of the professional lanternists and lecturers. But, although the lecturer looks upon this half of the year as his particular season, it must not be forgotten that there are a considerable number of lanternists whose services are always in season, by day or night, in summer or winter, and during the last year or so, Cinematography has been proof positive of this. Then, again, there are those whose entertainments are not of the "cut and dry" lecturing order, and who command engagements in hall, pavilion, or drawing-room, irrespective of season.

Lantern Slides.—The most beautiful and useful of all photographic productions, and made in a variety of ways, the most popular being by copying in a suitable camera, or by super-position. The first-named is practised most by the professional slide maker, and the latter by the amateur. The objects placed between the condenser and objectives are termed slides. Apart from the aid of photography, thousands of slides are made by what is known as the chromo-lithographic process, then transferred to glass. These are very highly coloured, and for many purposes are most effective.—*See* Photography.

Lawson's Saturator.—A saturator of the first order, it takes its name from the inventor.

Lecturer's Desk. — This is an accessory worthy of thought. The experienced lecturer possibly does without it, to him therefore advice does not apply. There are, however, hundreds who cannot well dispense with it, and they are strongly advised *not to try to do without it*. The reading desk, if portable, should, when set up, be rigid, and when possible be made a fixture for the time being. It should not be too large, nor too small. The table that only takes a book, or the speaker's manuscript, is often found inconvenient in use, owing to want of space. Twenty-two inches by fourteen inches is a useful size. When practicable, ordinary gas illuminant is first recommended, and for which a small jet should be carried in the outfit with a few feet of small rubber tubing. The light, whether gas, oil lamp, candle lamp, or otherwise, must be perfectly shaded, and so arranged that the rays fall only on the table.

Lengthening Tubes.—*See* Draw-Tubes.

Lens.—In practice, pieces of glass or similar substance, so moulded or cut into two forms, either convex or concave, that rays of light passing through take a different direction. The convex lens magnifies, whilst the concave lens diminishes. There are three or four forms of convex lenses, such as double convex, which is thick in the middle, tapering to almost a knife edge at its edges, the curvature on each side is the same. The *plano convex* is cut convex on one side and flat on the other, whilst what is known as a *miniscus* lens is cut *convex* on the outside, *concave* on the inside, thick at its centre, tapering to thinness at its edges. The double *concave* is just the reverse to the double convex, being hollowed on each side, thinnest at its centre, and thickest at its edges. There are also *plano concave* and the *concavo-convex* lens. Combinations of these several forms are put together for a variety of branches of science, *photography* and the *optical lantern* being among the most important. By a careful union of lenses, of different curvature and refractive power, on a scientific basis, the many different rays of light can be brought to a common focus. Large lenses are recommended for lantern work, the two chief reasons being *more light* and *flatness of field* — which, to a lanternist, is of the greatest importance. (Various *formulæ*, relating to the subject, may be found in works on Optics.)

(*To be continued.*)

Some Remarks on Lantern Slides.—No. II.*

By ALFRED STIEGLITZ.

FOR use take 2 ounces of I. and 4 drops of II., always remembering to add II. to I., and never reversing the operation. This amount of solution will tone at least one slide to a perfect blue. The toning bath, in order to work satisfactorily, ought to have a temperature of 72° to 76° Fahr. Using a bath at a lower temperature results in failure, as the toning proceeds too slowly and unsatisfactorily in other respects. A higher temperature will hasten toning, but the gelatine of the plate is apt to be attacked in a most disagreeable way.

To judge the process of toning, it is necessary to examine the slide by transmitted light, using daylight if possible. A thoroughly toned slide will have a pure blue colour when examined in that way. According to my experience, it is advisable to tone reduced slides after they have been dried, especially in such cases in which only partial toning is to be used. As for the density of toned slides, let me say that those toned with the above bath do not increase in density perceptibly.

Green.

In order to obtain a green slide, the following treatment is best:—

I.	Oxalate of iron	20 grains.
	Ferricyanide of potassium ..	15 ,,
	Water	32 ounces.
II.	Chromate of potassium	5 grains.
	Water..	16 ounces.

Bathe your slide, which in this case must be somewhat lighter than the desired result, in solution I. In this bath the colour will turn to a dark blue. From this it is placed in solution II. for a minute and then dried. When dry the slide will be a bright green.

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* Extract from *Camera Notes*, New York.

Bartolozzi Red.

Bartolozzi red is obtained by using the following bath :—

I.	Ferrocyanide of potassium (yellow prussiate)	15 grains.
	Water	16 ounces.
II.	Nitrate of uranium	30 grains.
	Sulphocyanide of ammonium	150 ,,
	Citric acid (crystals)	30 ,,
	Water	16 ounces.

For use, take one part of I. and one part of II., and place your slide, which must be first thoroughly soaked, in this solution. It will quickly assume a beautiful Bartolozzi red colour. In many cases the whites are stained in colouring the slides in this way, and in order to remove the same dip them into

Carbonate of soda	15 grains.
Water	32 ounces.

for a moment, not longer, and the stain will disappear. After this operation proceed to wash.

Partial Toning.

In using the gold toning bath some beautiful effects of colour may be obtained by so-called partial toning. These colours are obtained by dipping the slides into the toning solution for a short time and then examining them by transmitted light. The combinations of the original ground colour of the slide and the partial deposit of the gold, which is blue, gives us quite a range of purples, blues, reds, greys, blue-blacks, etc., the colour depending upon the ground colour and the length of toning. Many of the snow scenes, before mentioned, were treated in this way.

Local Toning with Different Baths.

While experimenting with the above-mentioned and many other colouring processes, it struck me to try and colour slides by using these baths on one and the same slide locally. In order to succeed quite a little skill in handling the brush and the various solutions, as well as the water faucet, are essential. And even at that, most slides are apt to be spoiled by the colours running into each other. My mode of procedure is as follows :—I take a dry slide, dip into water so as to simply moisten the surface of the gelatine, and then apply the gold toning solution with a small or large brush, as the occasion may require, to those portions of the slide which are to be coloured to blue, and shades of the same, and also the blue-blacks and purples, all of which are obtained by the sulphocyanide bath. After these portions of the slide have been coloured satisfactorily, an operation which is most trying to one's patience and nerves at times, the other portions are treated successively with the various remaining baths. In most cases the results are exaggerations and also crude ; nevertheless, such a slide, especially from a chemical point of view, is of great interest. In certain instances, however, such local colouring or toning is of great effect and beauty, especially if the original ground colour of the slide be kept and another colour simply suggested in parts. Some of the Venetian scenes in which water, sky, and a few houses and gondolas make up the picture, treated in this manner, show up beautifully.

As a general rule the monochrome slide is preferable to those coloured by any means whatever, especially for pictorial purposes. Nevertheless, an occasional suggestion of colour, if used very discriminately and with understanding, relieves the monotony of an evening's entertainment of slides, always remembering that by coloured slides I refer to photographically coloured ones, and not those tinted by hand with aniline dyes. Those can hardly be included within the limits of legitimate photography.

* * *

Facts Concerning Light.

By REV. JOHN ST. JOHN.

THE subject of this brief article has been claiming the attention of mankind since the creation of the world. In scriptural history we read (Gen. i., 3) "And God said, let there be light, and there was light," and further on, in the early part of the Christian era, mention is again made of light, and so through all ages and by all people it has ever been seriously considered.

Light seems to govern the laws of all that is animate, and much that is inanimate on the earth's surface, and understood, to a degree, by its appearance or disappearance—by the starling, the wolf, the toad, the lizard, the bear, and all of their kind.

The fruits and vegetation of the land are dependent upon light for their maturity ; look in the garden, the tree is in full blossom, and the fruit gets bigger and fuller each day. Observe that big apple almost hidden by the leaves, and whose very weight all but brings down the slender branch that bears it. At length the breeze disturbs the leaves, and lets in the warm sunshine. From that moment the apple begins to brighten in colour ; it ripens, it matures, it can hold on no longer, and falls, rosy and full-grown, plump into Dame Nature's lap.

It will be quite within the mark to state, however, that it is the science side of light that the readers of this journal are most interested in, so we inquire what does this science teach.

Light is closely associated with heat; appearing both in solids and liquids when intensely heated. It is a succession of exceeding small particles of matter issuing from a luminous body, as the sun, a fire, candle, etc. These particles flow in all directions without interrupting one another, and so minute are they as not to be discernible by our highest power microscopes. If this were not so, instead of being of service to us, they would soon deprive us of sight, by the force arising from their amazing velocity, which is known to be upwards of 11,500,000 miles in a minute.

To demonstrate that the rays of light move in all directions from different bodies without interrupting one another, set up vertically on a table a thin plate of metal, having at its centre a small hole, size of pin. On one side of this plate place a row of lighted candles close together, then place at a short distance from the plate on the other side a **sheet of paper** and it will be seen that the rays of all the candles will form as many specks of light on the paper as there are candles before the plate, and each speck as distinct and large as if there were only one candle to cast one speck, thus showing that the rays do not obstruct each other in their motions, although they all cross at the hole.

Light and heat, as far as the latter depends on the sun's rays, decrease in proportion to the various distances of the planets from the sun, and consequently in proportion to the distance of any object from a fire, a lamp, or a candle.

Now let us see how this will affect the luminosity of a disc on a screen at various distances from the seat of light with the same focus of lens. Take an example from the lanterns set up by Tom, Dick, Harry, and Joe. That of the first named is distanced at two feet between screen and light, the second at four feet, the third at six feet, and the last at eight feet. Therefore, the square of their respective distances will read—first, 4; second, 16; third, 36; fourth, 64. Consequently, Tom enjoys four times as much light or heat as Dick, nine times as much as Harry, and sixteen times as much as Joe, and contrariwise, Joe has to put up with the sixteenth part of the light that Tom has at his disposal. By this rule is determined the proportional quantity of light or heat that the earth, moon, or planets have from the sun.

Ordinary white light is understood to be capable of being split up into two parts or pencils, each composed of white lights, and when this is done they are said to constitute polarised light. Sometimes this separation is effected by certain minerals, sometimes by allowing light to fall upon different substances at a particular angle, when one part is transmitted and the other reflected. This polarisation of the light is very curious, and behaves according to the manner in which it falls, when it appears, as it were, to possess sides. It is found by experiment that the polarising angle is that which the reflected and transmitted portions of the incident ray are at right angles to one another.

The chemical action of light, although not understood perhaps so fully as the action of heat, still it must be admitted that progress in that groove of thought during the past half century has been enormous. The daguerreotype, no doubt, was the key that opened the way to the thousands of natural curiosities in this direction, and built up photography to what it is to-day. The most interesting illustrations of the chemical action of light is undoubtedly those that treat of the tracing of the image on the sensitised plate, and the transference experiments with photogenic papers.

The action of light is conspicuous in its influence on plant and animal life. Absence of the sun's rays is followed by pallid complexion, loss of vitality. Place plants in the dark, with just an opening or so through which light may enter, and it will be found that shoots from the plants will take the direct path of the rays, thus proving the life-giving power of light.

Optics being the twin study of lights, a few facts concerning them will be given in a subsequent article.

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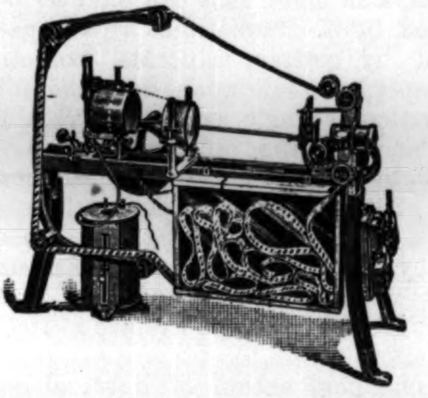
NEW APPARATUS.

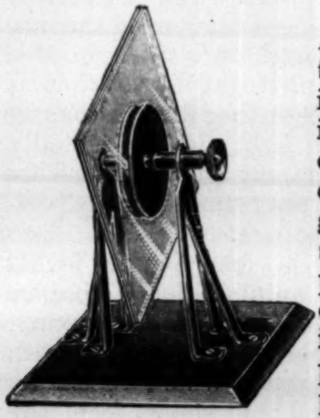
THE CINEOGRAPH.

This apparatus, in its complete style, is rather odd looking compared to the lanterns of our younger days. It is specially designed for using endless films, so that a comparatively short film may be made to run for any time desired. This outfit, which has been brought out by Mr. S. Lubin, 19, South Street, Philadelphia, weighs only 40 lbs., and is designed to project pictures 16 by 20 feet. It is supplied in complete running order, with four films, each 50 feet long, for $75.



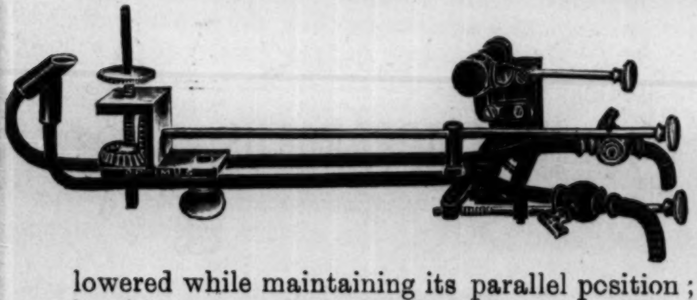
SLIDE VICE.

A new pattern of lantern slide vice for binding slides has been issued by Mr. W. Tylar, of Birmingham. The clamps are held together by means of a spring, and in order to place the slide and cover glass in position it is only necessary to pull back the knob portion.



"OPTIMUS" CENTERING JET.

Messrs. Perken, Son & Rayment have placed on the market an excellent method whereby a jet can be quickly centered from the back of the lantern. Turning the milled head at the right hand side causes the jet to be raised or lowered while maintaining its parallel position; by this means, in contradistinction to tilting, there is no fear of the nipple causing any shadow. The movement of the left mill-head causes the jet to be adjusted from one side or the other. Both motions work particularly smoothly.



PATENT INTELLIGENCE.

The following List, relating to current Patent Applications, is compiled expressly for the "Optical Magic Lantern Journal" by W. P. Thompson & Co., Patent Agents, of 322, High Holborn, London, W.C., to whom all enquiries for further information should be addressed.

No.	Recent Patent Applications.
23887a.	20th November, 1897. B. J. Atterbury. Improvements in apparatus for the production of acetylene gas. (Date claimed under patents rule 19, 16th October, 1897.)
26591.	15th November, 1897. A. Wartenweiler. New or improved acetylene gas lantern.
26594.	15th November, 1897. E. Helvig. A new apparatus for producing acetylene gas.
26676.	15th November, 1897. F. Schmidt. Improvements in acetylene lamps.
26776.	16th November, 1897. J. Kremer. Improvements in acetylene gas generators.
26842.	17th November, 1897. Improvements in means for selectively using acetylene or the like gas with ordinary lamp apparatus.
26843.	17th November, 1897. E. S. Bond. Improvements in means for storing and using calcium carbide or the like for acetylene and the like gas generating apparatus.
26978.	18th November, 1897. E. T. Butler. A stereoscopic camera for producing negatives for the use of the krumscope or for other uses.
27029.	18th November, 1897. R. Von Maiti. Improvements in acetylene lamps.
27409.	22nd November, 1897. A. Failssol and H. Besson. An improved acetylene gas lamp or lantern.
27505.	23rd November, 1897. N. Nelson. Improvement in apparatus for taking, enlarging, and projecting successive pictures of moving objects. Complete.
27542.	23rd November, 1897. A. S. Newman and Newman and Guardia, Limited. Improvements in apparatus for producing limelight or the like.
27929.	27th November, 1897. C. W. Baxter, C. Wray, and J. Oulton. Improvements in film operating mechanism of apparatus for taking, printing, and exhibiting series of photographs.
28012.	27th November, 1897. H. H. Lake. (W. A. Shearer, South African Republic.) Improved apparatus for the production of acetylene gas from calcium carbide.
28121.	29th November, 1897. A. J. Morrison. Combined generator and lamp for making and burning acetylene gas.
28478.	2nd December, 1897. T. Barkley. Improvements in devices for adjusting limelight and other jets for magic lanterns.
28577.	3rd December, 1897. W. H. Duncan. Improvements in apparatus for showing photographs and moving pictures with and without coin-freed appliances.
28634.	4th December, 1897. H. E. Berry. Improvements in and connected with apparatus for producing animated photographs.

28773. 6th December, 1897. J. W. Scarth and W. A. Thornton. Improvements in or relating to lamps for burning acetylene gas.

29347. 11th December, 1897. A. Elsee and H. S. Pyne. An electrical slide changing apparatus and dissolver for optical lanterns.

29363. 11th December, 1897. W. Friese - Greene. Means or apparatus for producing and exhibiting animated or changing pictures on advertising and the like appliances carried on the person.

29364. 11th December, 1897. W. Friese - Greene. Means or apparatus for producing and exhibiting animated or changing pictures on vehicles, steam boats and the like for advertising and other purposes.

SPECIFICATIONS PUBLISHED.

Copies of the following specifications may be obtained by remitting 1/- for each specification to W. P. Thompson & Co., Patent Agents, 322, High Holborn, London, W.C.

27194 of 1896. Hargreaves. Acetylene gas.
658 of 1897. Tèdé. Acetylene gas.
991 of 1897. Dowsing. Producing X-rays on a screen.
21480 of 1897. Symons. Moveable devices for producing optical illusion changes (transparencies).
1929 of 1897. Thorp and Marsh. Acetylene gas.
16388 of 1897. Casler. Cinematographs and like machines.
16738 of 1897. Acetylene lamp.
26325 of 1897. Bault (Alexandre). Acetylene gas.

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Editorial Table.

PHOTOGRAPHIC MOSAICS.—This American annual, which has reached its 39th appearance, may be obtained from Dawbarn & Ward, Limited, London; price 2s. It contains several articles and hints of value to the photographer, also excellent illustrations.

THORNTON-PICKARD CATALOGUE.—The 1898 catalogue of the Thornton-Pickard Manufacturing Company, Limited, of Altrincham, contains details of substantial cameras, shutters, etc., made by this firm. Many clear half-tone illustrations of instantaneous photography are also to be found in its columns. As announced on another page of this journal, this firm is offering £200 as prizes in a coming competition.

"**WRENCH'S CATALOGUE.**"—Year by year the catalogue issued by the wholesale firm of Messrs. Wrench and Son, for use in the trade, has been growing. This year's issue, which has just come to hand, is a huge volume, and we note that they have kept the apparatus section low in favour of their lists of slides. So as to make room for these all reference to cinematographs has been omitted and a separate list for these has been issued. The sets of slides is enough to bewilder one, for close on 500 pages are devoted to lists of these. To give particulars here would be impossible, but the following abridgment will give a rough idea of what is to be found in the catalogue. In some instances some 70 pages are devoted to one particular heading as given by us. This abridgment comprises;—England, Wales, Scotland, Ireland, Great Britain, Islands round Great Britain, France, Italy, Germany, Holland, Belgium, Austria, Switzerland, Spain, Norway, Greece, Turkey, Syria, India, Ceylon, China, Japan, Holy Land, Africa, Egypt, America, Arctic Regions, Australia, New Zealand (Islands, travels, wars), Lives of eminent men, Educational sets (scientific), Astronomy, Human anatomy, Insect life, Earth worms, Plant life, Microscopic objects, Educational sets (miscellaneous), Commercial Geography of the British Possessions, The History of Great Britain, Instantaneous Studies, Yachts, Battle Ships, Cruisers, etc., British Army, Auxiliary Forces and Royal Navy, Portraits from life, Statuary, Common things, Natural phenomena, Æsop's Fables, Fables of "La Fontaine," Book of Martyrs, Mottoes, comic mottoes, curtains, and introductory slides, Illustrated songs, Illustrations of Poems by Burns, Illustrated songs from life models, Life model sets, Temperance tales from life models, temperance sets, Temperance entertainments, Nursery tales, Comic and miscellaneous sets, Religious subjects, Parables of our Lord, Service of Song slides, Allegorical Scripture History, English Church History, Sacred Pictures, Hymns, Temperance Hymns, Sankey's Hymns, Illustrated Hymns. We observe that Stocks' lamp, of which Messrs. Wrench are the proprietors, has been further improved and that they claim the new pattern to give 125 candle-power.

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Correspondence.

CARELESSNESS OF DEALERS.

To the Editor.

SIR,—Thank you very much for allowing the correspondence of Mr. A. Downes Shaw to appear in your journal, for what is the use of a magic lantern journal if only the interests of one party is considered, and that the trade only.

A great many of us are lecturing with the lantern in chapels and churches, and some of these places are now shut up against us simply because of the misfortune in connection with the use of saturators; and it is not a small matter to charge a shilling for a lecture, and four or five hundred present in the chapel to endure the unpleasant thing to sit down for two hours to look at the miserable pictures shown by a small Russian iron oil lantern, and sometimes without any pictures at all.

I myself had an audience of 500 in a chapel to hear a lecture with the limelight lantern, but the saturator failed me altogether, and I had to dismiss the audience; and though I printed posters and sent the town crier about the town to announce the same lecture free this time, not more than two dozen came the second time.

Another great annoyance I had was, that the valve tap of the oxygen cylinder and the key supplied by the same firm did not fit, so the audience had to put up with pictures shown with a small oil lantern, but after 15 minutes unsuccessful trials with the key, at last the valve opened, but it opened too wide, and not one of the audience nor myself could close it, which set the lantern all in a blaze; I had to disconnect the tubing and take the cylinder to the open air and thus waste the gas. If these things are allowed to pass unnoticed, no church, chapel, or schoolroom will be opened for lectures with ether saturators or limelight. This is greatly to be deplored, because some of us live 200 miles from a firm which supply cylinders and gas or saturators, and railway carriage alone for two cylinders amounts to 10s.

I hope you will invite the readers of your journal to communicate their thoughts on these points.

Yours truly,
CARRADOG.

—:o:—

Notes and Queries.

J. D.—It is very questionable if you would be able to obtain sufficient and proper lighting, even under the best conditions, to take cinematographic pictures of a theatrical play on the ordinary stage; such pictures require good light, and are usually taken on a stage erected in the open air and in bright light. If, however, you have the option of using the illuminants quoted by you, we would think the electric light, properly placed, the best.

A. B. Coleman.—The "ejector" we know to be good, the other we have not yet had an opportunity of trying, although the makers have promised to allow us to try it. This promise was made some time ago, but up to this date has not been fulfilled, consequently we cannot offer any opinion at present. It is, however, said to be good.

Frank Richards writes:—I bought a double lantern lately, but when putting the effect slides in their proper places in each lantern, found that they fell a long way out on the screen. The makers of the slides assure me that they are all right, but my lantern proves to the contrary. How should I alter the slides to make them fall right upon the projected picture? *Ans.*—We are quite confident from your query that you are a novice at lantern work, at least, in effect working. It is possible the slides may be all right, so for the present leave them alone. If your lantern has not already got, then get, two adjusting stages which can be fastened in the present stage, also get two registering crosses, put one in each stage, and adjust the false stage until the discs coincide on the screen. When this is done then put the slides in and cut or add to the frames until they also coincide on the screen. If this is not sufficiently lucid consult our back numbers (all of which can be obtained from the publishers), or write asking some definite question or questions.

J. Mumford.—We should advise you to do as you suggest.

Ch. Wake, Jun.—Be sure that the facts are as you state before taking any proceedings; if they are, then you should gain it, in our opinion; but at the best, law is so uncertain that if you can compromise do so by all means, and have a slight loss in the matter. To fight a strong firm is no joke.

R. Rose writes:—I have often noticed in accounts of a lantern entertainment that the apparatus has been described in the local papers as being a "powerful lantern"; can you tell me the difference between an ordinary lantern and a powerful lantern? *Ans.*—We presume the expression refers to limelight in contradistinction to oil, but perhaps it had best be taken merely as an empty expression. A good deal of latitude is taken by exhibitors in connection with their show bills which will not bear literal translation. We have known a new and showy lantern to be described as "powerful," and the same make but shabbier through use, used under about the same conditions, mentioned without this qualifying word.

A. Y. M.—We have several times been promised an opportunity of trying No. 1, but so far have not had the opportunity afforded us, so at present must say we are ignorant as to its behaviour. Nos. 2, 3, 4, are all first-rate, and you cannot go far wrong in taking either. You must remember that the more light the more heat.

J. asks:—How can I obtain good coloured slides from photographs? If you wish to make the slides from small unmounted photographs you can in an ordinary printing frame make a negative by contact and in the same manner a lantern transparency from the negative so obtained; by this means you will get all the fine detail which is in the print. If the print be mounted or large, it will require to be copied in the camera, and a transparency made from this. Not knowing the extent of your photographic and artistic knowledge we can only say that you may be able to make a passable transparency with a few instructions, but as for the colouring you might find it preferable to entrust it to some one who makes a business of such.

R. Hopwood.—We must congratulate you on your knowledge of English, and think you deserve the greatest credit in thus acquiring it. You suggest writing us fuller in your own language (Welsh), please don't, for Welsh is a language in which our education has been neglected. We once knew a native of your parts who used to give us some jaw-breaking recitations presumably to show the power of the language, and we quite made up our minds never to attempt to acquire it. However, any definite questions which you may ask will have prompt attention, but keep to the English language, please.

G. E. Brown.—Article was returned, for although very interesting, it is not suitable for our columns, but there are no doubt many slide makers who would be glad to acquire it as a reading for a set of slides on the subject, *i.e.*, Sugar.

Lanternist.—(1 and 2) An opaque screen of say 8 feet will be preferable for drawing-room entertainments. (3) Certainly, take a stand with you, but it need not be a tripod. (4) With oil light a guinea should be about the fee.

P. Newland.—You ask if we are not in error on some point or other *re* description of oxygen generator, but you do not say what these points are. When we notice an apparatus and say it does so-and-so, it is because we have found the particular article which we have tried to behave thus in our hands. If you think we are wrong in the case cited, be good enough to particularise.

D. S. B.—(1) We think not. (2) For acetylene gas we use the 00000 burner in front of the 0000. (3) Four and even five burners have been used together, but we have confined ourselves to two only, hence have no actual experience; but in the manner you suggest you would get too large a surface, and we think also smoke at the point of juncture. (4) Clean chamois or silk.

H. T. Walton.—Kerosene oil of high flashing point is the best to use in a Stocks' lantern lamp.

W. D. Askew.—Procure the slide catalogue issued by Valentine & Son, of Perth-road, Dundee. From this you will be able to select such slides as will best fit in with Scotch songs.

Several interesting articles have been held over till next issue for want of space.